

REMARKS

Administrative Overview

Claims 56-76 were examined in the Office action of September 20, 2007, and are pending.

Claims 56, 57, and 65-76 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Publication No. 2002/0154132 (**Dumesny**) in view of “Seamless texture mapping of subdivision surfaces by model pelting and texture blending,” SIGGRAPH 2000, New York, NY, pp. 471-478, ISBN: 1-58113-208-5 (**Piponi**).

Claims 58-64 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over **Dumesny** and **Piponi**, and further in view of U.S. Patent No. 6,707,458 (**Leather**).

Without acquiescing to the rejections, Applicants amend independent claim 56 as indicated in the Listing of Claims, thereby importing the limitation “arbitrarily-shaped, user-defined region” from the preamble into the body of the claim. This is supported in the specification as originally filed, for example, at page 3, lines 12-13.

No new matter is added. Upon entry of this paper, claims 56-76 will still be pending.

Independent claims 56 and 70 are each patentable over **Dumesny in view of **Piponi****

The Office Action of September 20, 2007, states the following, in reply to Applicants’ arguments filed 7/20/07:

Firstly, in response to applicant's arguments, the recitation “...in an arbitrarily-shaped, user-defined region...” in independent claim 56 has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

None-the-less, in response to the above argument as per claim 56 (and all dependent upon claim 56 claims) along with claim 70 (and all dependent upon claim 70 claims), as stated in the above rejection of claims 68 and 76, Dumesny et al. explicitly discloses allowing a user to select a region via one or more of particular polygons of a 3D graphic object to texture map data thereto (see paragraphs 44 and 47). Further, Dumesny et al. explicitly discloses that only if no polygons are selected by a user that all polygons forming the 3D object are subsequently textured (see last 3 lines of paragraph 44). Therefore, the Office interprets at least Dumesny et al. of the combination of Dumesny et al. and Piponi to disclose the argued feature as seen above.

Applicants respectfully traverse the rejections.

Applicants amend claim 56 such that the limitation, “arbitrarily-shaped, user-defined region” is not limited to the preamble. Regarding claim 70, applicants note that this limitation already appears in the body of the claim.

Applicants contend that the selected polygonal surface in **Dumesny** is not an “arbitrarily-shaped, user-defined region”. The shape of the selected region of **Dumesny** is not arbitrary – it is restricted to an entire polygonal face of an object. In contrast to **Dumesny**, the present invention allows wrapping texture within an arbitrarily-shaped, user-defined region, for example, as seen in Figure 21C below (reference **1806**):

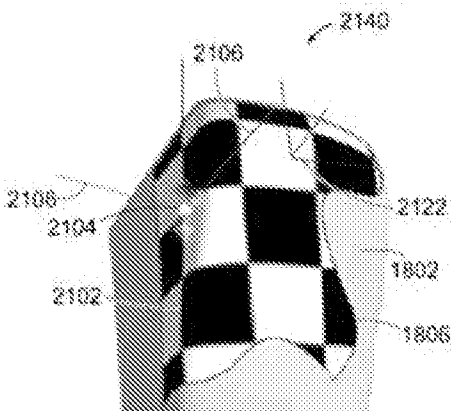


FIG. 21C

Region 1806 of Figure 21C has an irregular, arbitrary shape drawn by a user onto the surface of the three-dimensional object. It does not cover an entire face of the object, and, in fact, overlaps various sides of the object. The object itself is not limited to sharp-edged polyhedra, but can have soft edges.

It is difficult and non-obvious to perform texture wrapping within arbitrarily-shaped, user-defined regions, as taught in the present invention. Furthermore, it would not be obvious to combine **Dumesny** with **Piponi** and modify the combined teachings to allow for wrapping texture within an arbitrarily-shaped, user-defined region, as recited in claims 56 and 70 of the present application.

Applicants' previous arguments are reproduced below, for reference, as they are still applicable:

Independent claim 56 is patentable over **Dumesny** in view of **Piponi**

Independent claim 56 is patentable over **Dumesny** in view of **Piponi** because neither reference teaches or suggests application of the claimed method for an arbitrarily-shaped, user-defined region.

The mapped region in **Dumesny** is not arbitrarily-shaped. As explained in Applicants' response filed on July 6, 2006, **Dumesny** describes texture mapping methods that require use of mapping functions of fundamental surface topologies (geometric primitives), such as planes, cubes, cylinders, spheres, and cones. **Dumesny** applies its texture mapping techniques to the face of a cube, but the techniques do not work for arbitrarily-shaped, user-defined regions.

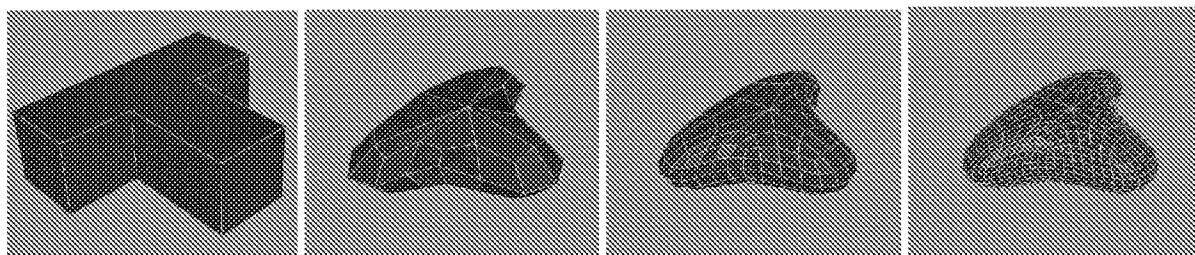
Piponi also fails to teach or suggest application of the claimed method for an arbitrarily-shaped, user-defined region. The "subdivision surfaces" of **Piponi** are planar facets of a polygonal mesh defining the entire surface of a 3-D object. The "subdivision surfaces" are not arbitrarily-shaped, user-defined regions because their shapes are governed by a subdivision scheme and, consequently, they are not arbitrarily-shaped and they cannot be drawn, selected, or otherwise defined by a user. They cover the entire surface of a 3-D object, not just a portion of the surface. **Piponi** explains this on page 471, second full paragraph, reproduced as follows:

Subdivision surfaces are constructed by starting with a polygonal mesh that forms a manifold, M^0 . A subdivision process is applied to this mesh to produce a new higher resolution mesh M^1 and then this process is iterated to form meshes M^0, M^1, \dots that better approximate the limiting mesh M^∞ [6], [7]. The subdivision scheme is chosen in such a way that under reasonable conditions the limiting surface is smooth.

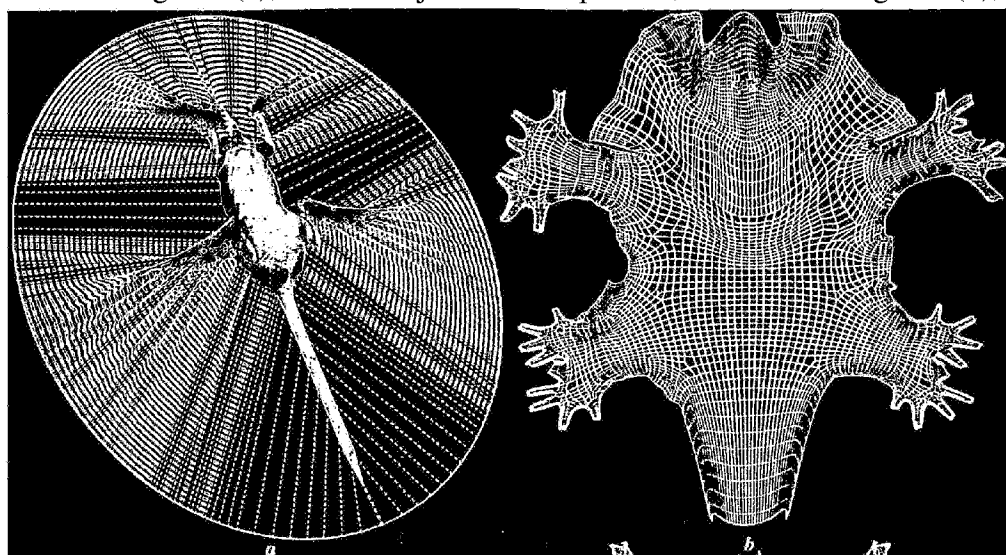
In this paper we consider only Catmull-Clark surfaces but the techniques extend naturally to other subdivision schemes. (For clarity of exposition we consider mainly Catmull-Clark surfaces derived from quadrilateral meshes. After the first Catmull-Clark refinement any polygonal mesh becomes a quadrilateral mesh anyway [22].)

Piponi uses Catmull-Clark subdivision surfaces to cover an entire 3-D object, prior to "pelting." For example, the following drawings from the article, "Catmull-Clark Surfaces," by

Kenneth I. Joy,¹ illustrate the application of a Catmull-Clark subdivision scheme to define a polygonal mesh (subdivision surfaces) to cover the surface of a 3-D object:



In **Piponi**, the entire 3-D object is discretized using Catmull-Clark subdivision surfaces, as shown in Figure 4(a), and the object is then “pelted”, as shown in Figure 4(b), reproduced below:



The prior art neither suggests nor enables adaptation of the techniques of **Dumesny** and/or **Piponi** to the wrapping of a texture onto an arbitrarily-shaped, user-defined region of the surface of a 3-D virtual object, as recited in claim 56 of the present application.

Because none of the cited art, individually or in combination, teaches or suggests every element of claim 56, then claim 56 is patentable over the cited art. Applicants therefore request the reconsideration and withdrawal of the rejection of claim 56 under 35 U.S.C. 103(a).

Dependent claims 57-69 are patentable over the cited art

Likewise, because a dependent claim includes all of the limitations of the independent claim from which it depends, Applicants assert that dependent claims 57-69 are patentable, at least on this basis. Applicants request the reconsideration and withdrawal of the rejections of dependent claims 57-69. Applicants reserve the right to present further arguments regarding the

¹ On-Line Geometric Modeling Notes, Department of Computer Science, University of California, Davis (undated), <http://graphics.cs.ucdavis.edu/education/CAGDNotes/Catmull-Clark.pdf>

patentability of the dependent claims, should this become necessary. For example, Applicants reserve the right to present further arguments traversing the rejections of dependent claims 58-64.

Independent claim 70 and its dependent claims 71-76 are patentable over **Dumesny** in view of **Piponi**

Claim 70 is an apparatus claim related to the subject matter of claim 56. For the reasons discussed above with respect to claim 56 and its dependent claims, Applicants contend that claim 70 and its dependent claims 71-76 are patentable over the cited art.

CONCLUSION

Applicants contend the claims are in condition for allowance. Applicants respectfully request reconsideration and withdrawal of all rejections, and allowance of claims 56-76 in due course. The Examiner is hereby cordially invited to contact Applicant's undersigned representative by telephone at the number listed below to discuss any outstanding issues.

Respectfully submitted,

Date: October 31, 2007
Reg. No. 53,002

Tel. No.: (617) 570-1013
Fax No.: (617) 523-1231

William R. Haulbrook, Ph.D.
Attorney for Applicant
Goodwin Procter LLP
Exchange Place
Boston, Massachusetts 02109
Customer No. 051414